



# Gas Fired, Reciprocating Engine-Based Cogeneration

**U.S. Department of Energy**

**DE Road Show**

**October 2002**

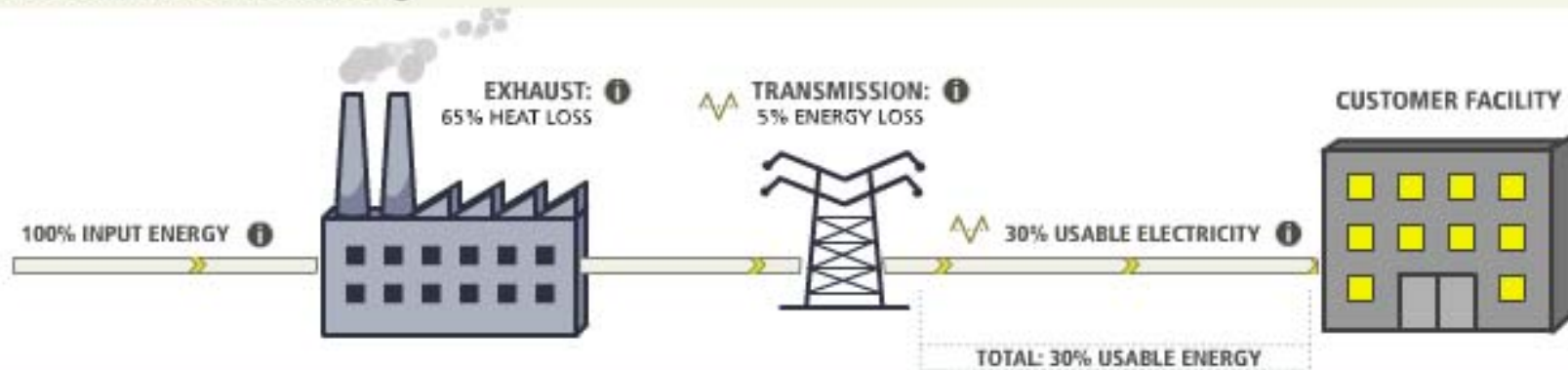
- **Onsite cogeneration - concepts and components**
- **Typical cogeneration system fit and layout**
- **Electrical single line**
- **Key installation requirements and codes**
- **Cogeneration implementation process**
- **About Hess Microgen**

**Onsite cogeneration offers significantly greater efficiency than traditional utilities.**

### *Utility Power vs. Onsite Cogeneration*

*click on ❶ for more information*

#### TRADITIONAL CENTRAL UTILITY ❶



#### ONSITE COGENERATION ❶



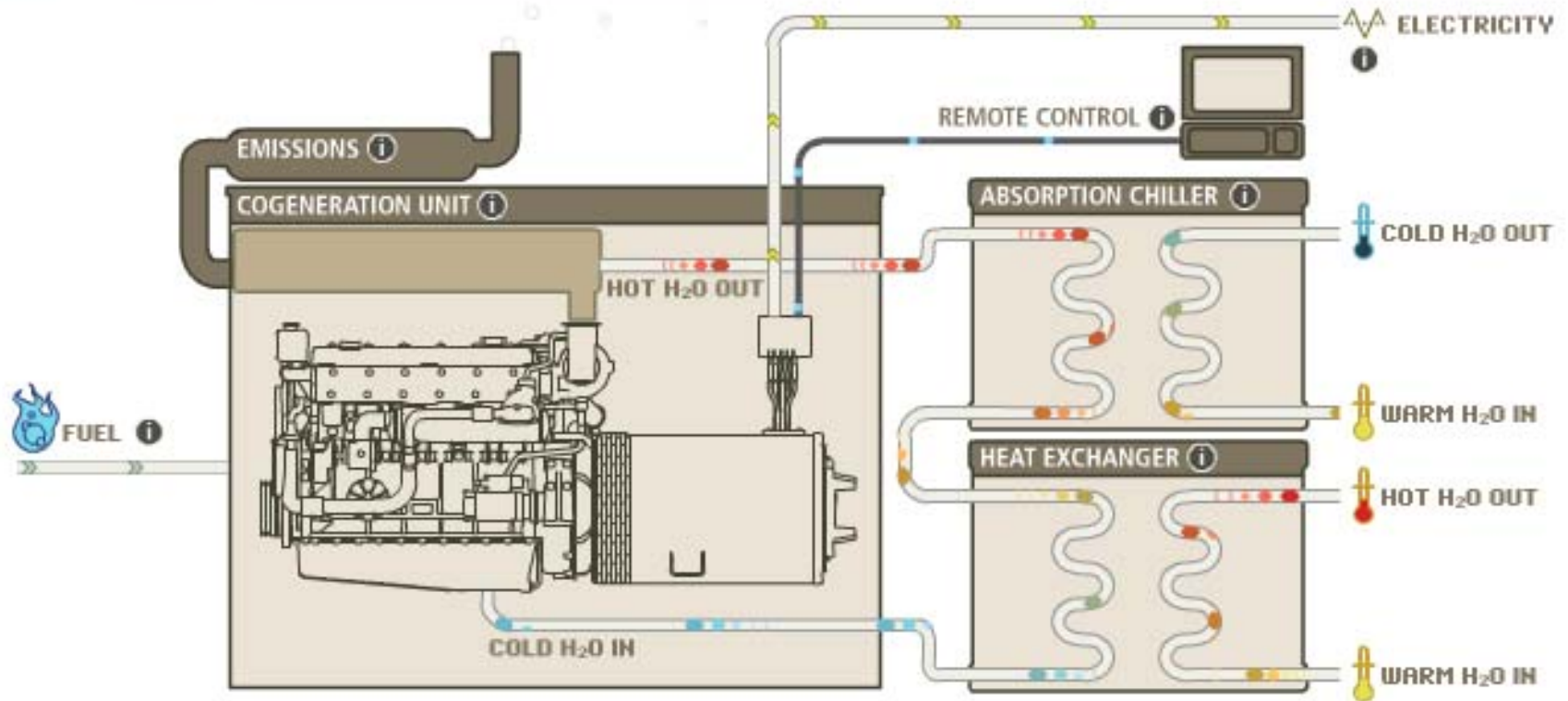
**Cost savings, additional reliability, and environmental benefits result from onsite cogen.**

**Cogen thermal output can be used to offload existing electrical chilling loads, produce additional electricity through a Rankine cycle-based generator, and offload heating systems.**

### How Cogeneration Works

click on ⓘ for more information

#### What Is Cogeneration? ⓘ



## Standard 60 Hz Systems

<u>Unit</u>	<u>Electricity</u>	<u>Heat</u>
75	75 kW	4.5 Therms/hr
140	140 kW	6.7 Therms/hr
200	200 kW	10 Therms/hr
250	250kW	14 Therms/hr
350	350 kW	17 Therms/hr
450	TBD	TBD

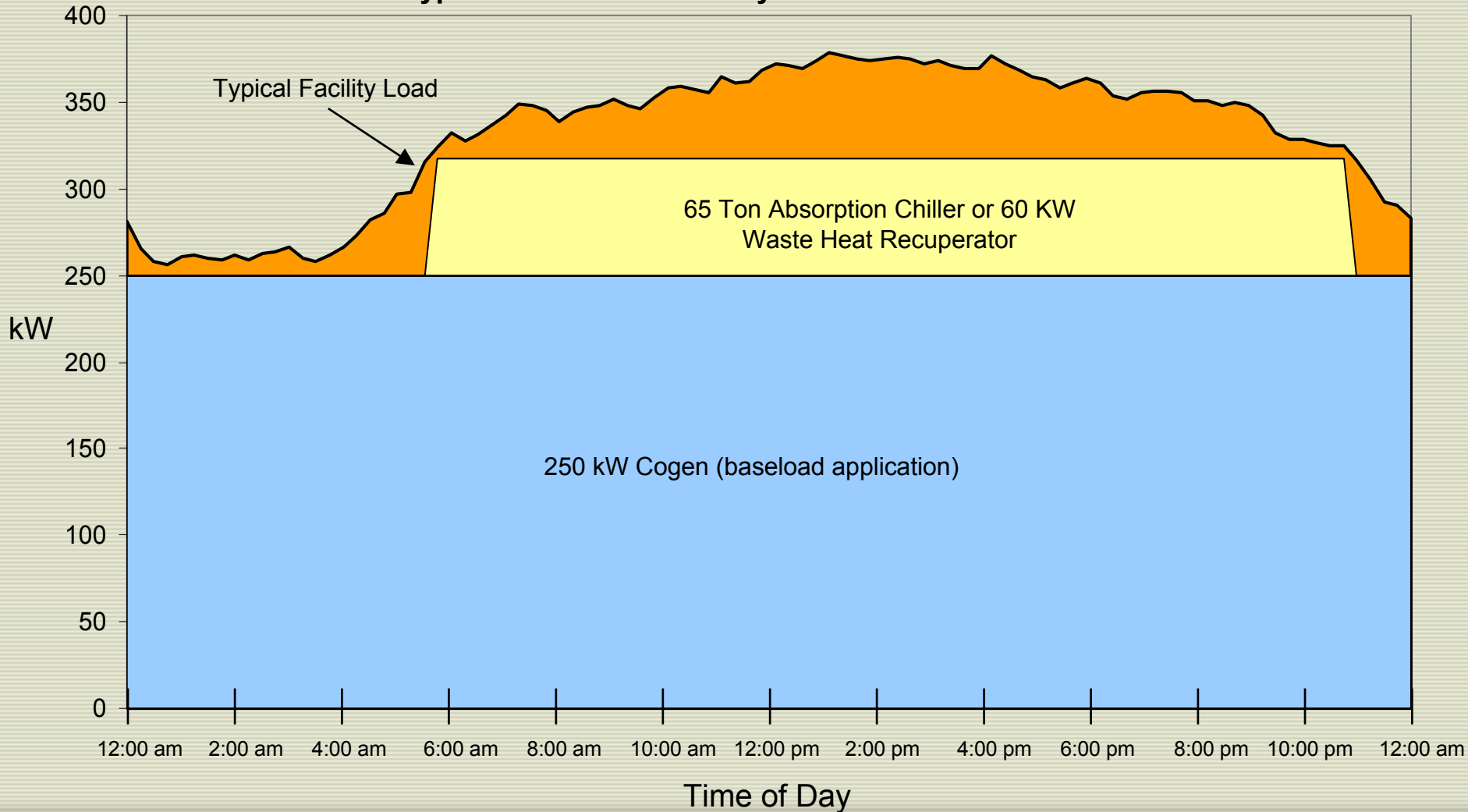


## Key Features, Certifications, and Listings

- UL 2200 listed on entire cogen unit
- UL 508 listing on the control system
- UL 1741 certified, awaiting listing
- Natural gas-specific design, not a converted diesel
- SCAQMD compliant; most stringent air quality district in the country (< 9 ppm NOx, < 60 ppm CO)
- Onboard, integrated switchgear
- Consistently interconnect under CA's Rule 21 standard
- "Call home" control system
- Synchronous generators can run with or without utility grid connection

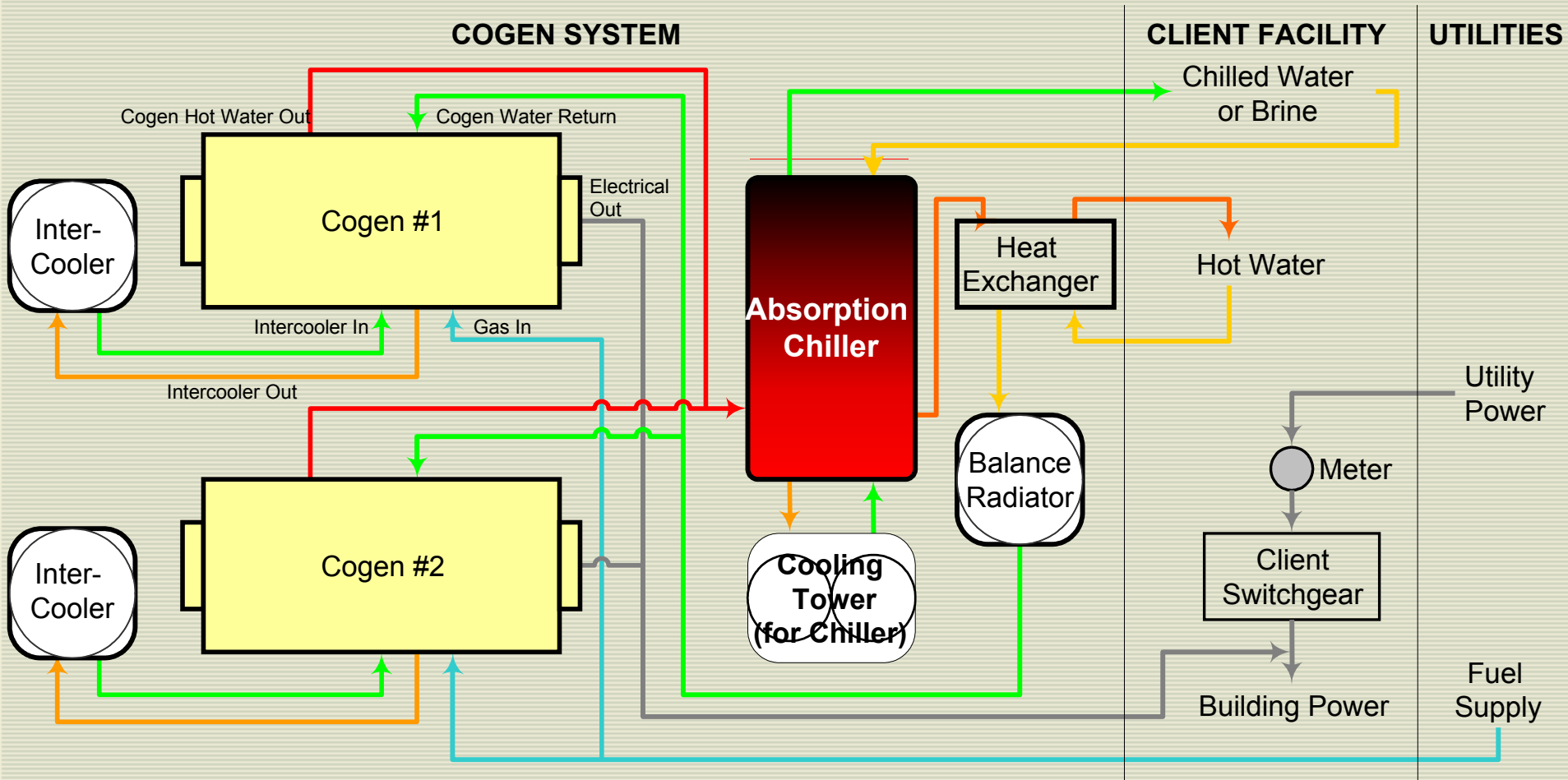
**Cogen systems can be applied to deliver both baseload and peak shaving needs.**

**Typical Food Sales Facility 24 Hour Load Profile**

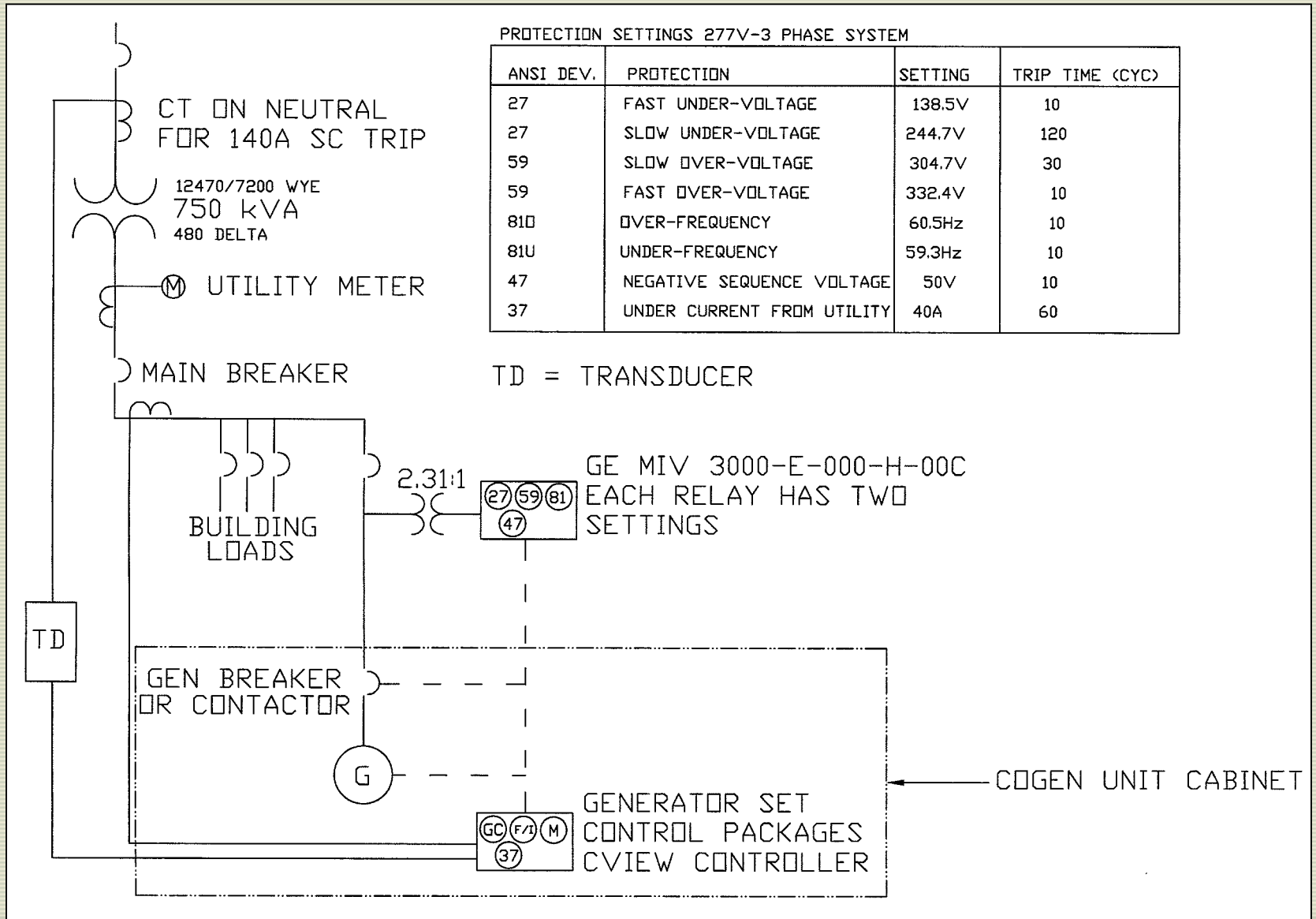


## Typical Cogeneration System Cycle and Layout

**Systems can be configured for a wide range of applications. A typical configuration will make as much use of the thermal output as possible.**



# Cogeneration Singleline Electrical





### **Placement:**

- 3,500 PSI reinforced 6" thick (min) concrete pad
- Subgrade – compacted to 90% relative density

### **Ventilation:**

- 800CFM of make-up air
- 3,000CFM of ventilation air
- National Fuel Gas Code, ANSI Z2223.1-1988

### **Exhaust:**

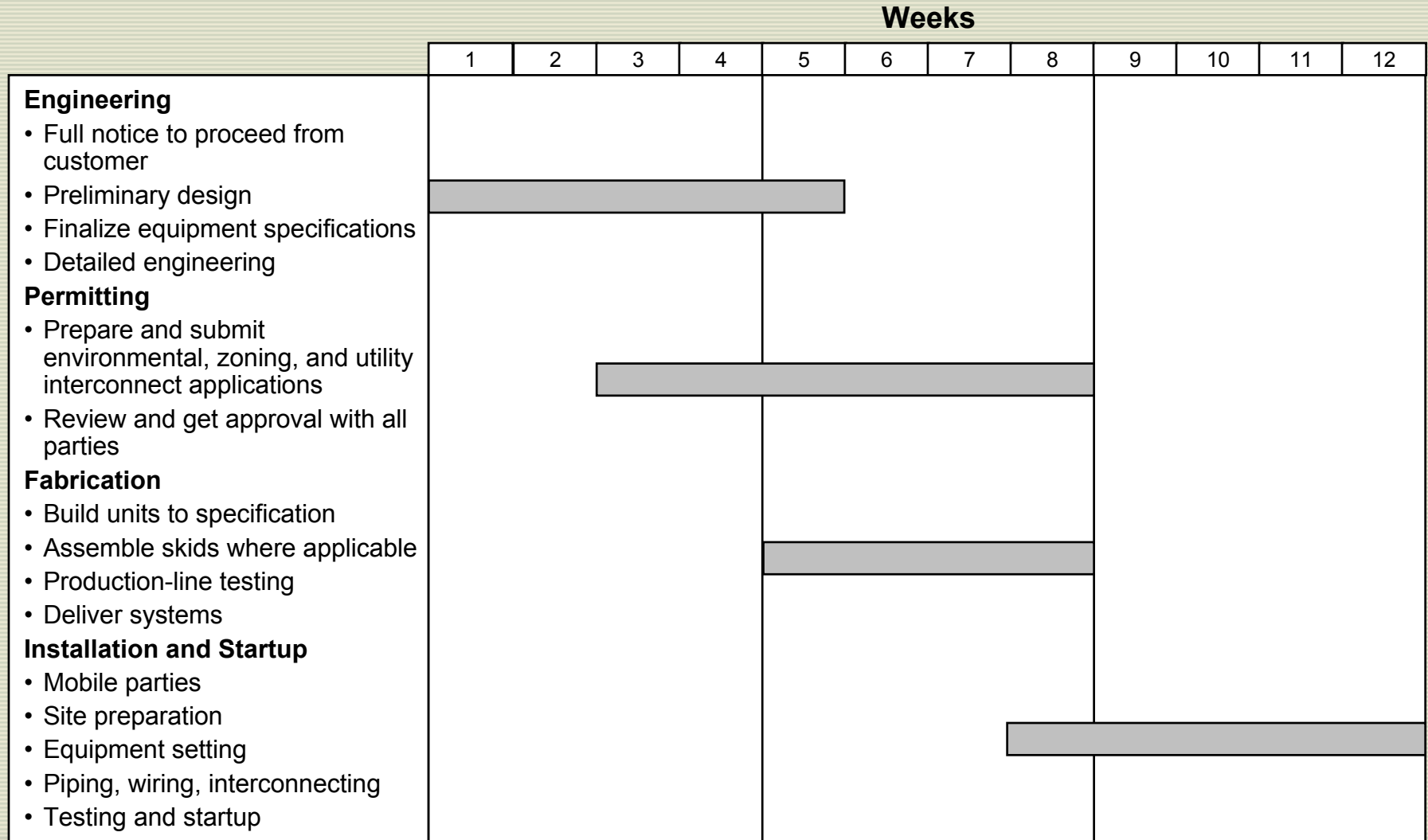
- National Fuel Gas Code, ANSI Z2223.1-1988
- Max back pressure is 23.6" of water for 140 & 200 series
- Max back pressure is 31.0" of water for 250 & 350 series

### **Electrical:**

- NEC/ANSI/NFPA 70-1996

Note: local codes prevail

**Although onsite cogeneration is a fairly new concept, implementation is quickly becoming common. Installation takes 3 to 6 months, largely dependent on local permitting requirements.**



**Hess Microgen is the performance AND price leader in delivering economical, reliable, and environmentally-friendly energy with more than 100 systems operating in the US and abroad.**

- Engineer, manufacture, and market packaged cogeneration systems
- Industry pioneer with over ten years of cogeneration experience
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- Offer turnkey projects, direct sales, and shared savings programs
- Own field service organization and 24 hour operation center
- Part of Amerada Hess, a Fortune 200™ company, with a 75 year history of legendary customer service



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